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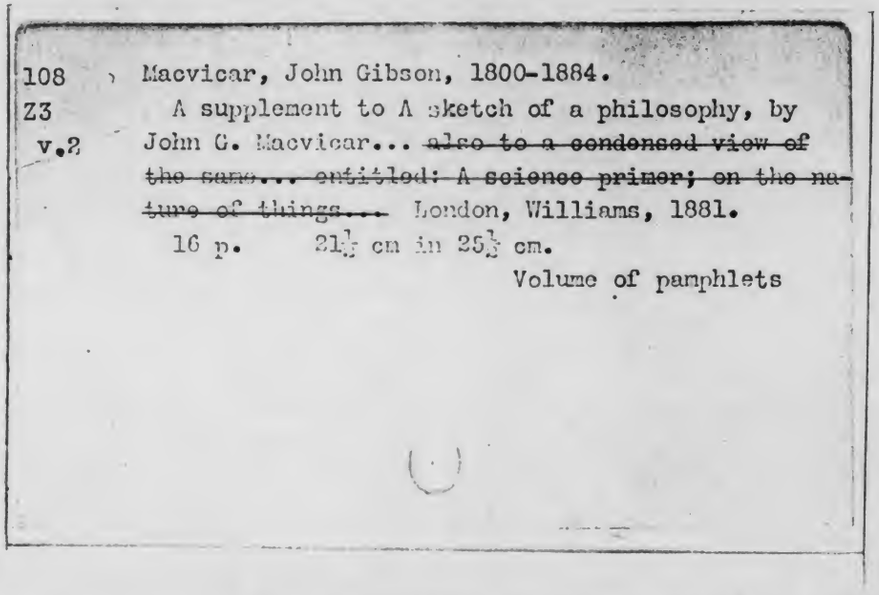

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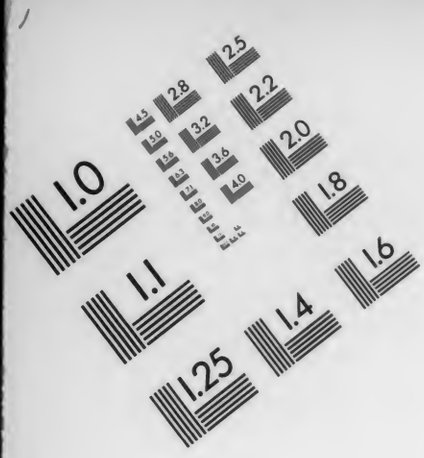




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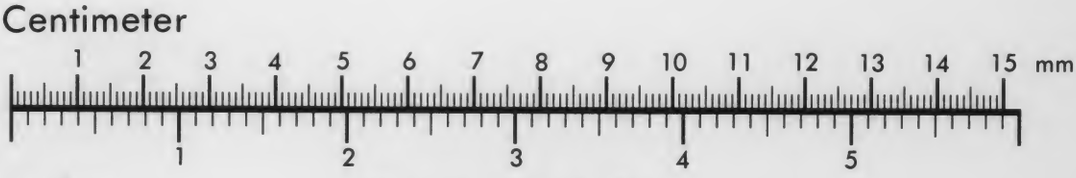


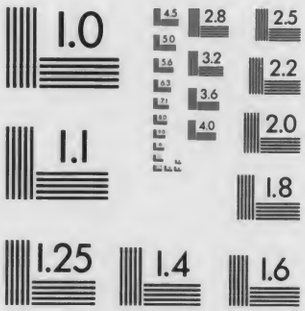

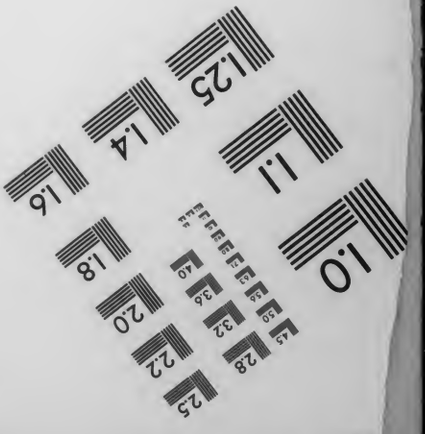


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# PART I.

## THE COSMIC LAW.

THE physicist having for his theme the simplest data for thought, viz., time and space, and matter viewed as homogeneous and as consisting only of physical points, meets with fewer interruptions to a train of scientific thought than the chemist and physiologist, and consequently has been able to impart to physics a more continuous and scientific character.

This appears in his primary classification of the related phenomena into (1) *kinematics*, or the doctrine of pure or mere motion; and (2) *dynamics*, that of motion caused by physical force and applicable to nature.

Now when we proceed to specialise physics and to apply its beautiful results to nature in detail, as we see nature developing itself or already developed around us, it is possible to imitate successfully, I think, the primary classification of the physicist by regarding local movements as existing (apparently to the senses) in a statical phase, and thus producing finite forms, and creating a field for the science of morphology.

And here, learning to classify from the physicist, we may propose

(1) a PURE MORPHOLOGY.

(2) A morphology treating of natural forms, which for a reason that will soon appear may be called PLASMATOLOGY.

This separation of form from substance, and the institution of a doctrine which while it is a purely mental construction, offers itself also as an explanation of the phenomena of material nature, depends on the echoing between thoughts and things when both are rightly conceived, and law applied in every case — a single law. The discussion of this law requires a metaphysical excursus which must be sought for elsewhere.* Meantime, by those who have acquainted themselves with it and applied it to phenomena, and found it to explain phenomena better than any other hypothesis they are acquainted with, though they may refuse their sanction to the method of its derivation (by pure thought verified indeed by

* See "A Sketch of a Philosophy," part i. and *passim*.

sensation, but not gathered from it), and though therefore they cannot lay hold of it by the head, may yet catch it by the tail.

Its full name, without being longer than many names with which modern science is familiar, might be the theoucosmogenetic law—the law of God, genetic of the cosmos. But omitting all possible syllables, *brevitatis causa*, and to avoid the twofold offence of innovating in names as well as things, we shall call it simply THE COSMIC LAW.

### ASSIMILATION.

In detail it is a law of all-embracing reciprocal assimilation both as to time and space. In space it produces the simultaneous assimilation of parts and particles on a principle of unity, and gives to nature symmetry along with individuality. In time it assimilates the future to the past, giving harmonious development and heredity. And in a word it produces the effect that every object tends to suggest and to mirror more or less either directly or inversely every other object; giving universal harmony, while all harmoniously unites in echoing the voice of the one omnipotent author of all, who is imminent and omnipresent in all.

This law may be illustrated by an allusion to that process by which our own organisation is continually reintegrated under continuous change and loss, and our life maintained from day to day, in reference to which the term assimilation is already in familiar use, though bringing along with the name no special light on the successive stages of the process except that they are seen to be cases at once of analysis or solution and of synthesis or reconstruction (as plainly they must be in order to assimilate things dissimilar) under the influence of agents to which there is now applied the name of ferments.

What these agents are, and how they act, is quite unknown to science. On these processes, however, our cosmic law does throw light, such light as may prove useful to dyspeptics and to the doctors to whom dyspeptics resort for relief.

Here, however, I shall mention only one condition (suggested by our law) to the successful assimilation of food.

### THE ETHEREAL PRIMAL AND ULTIMATE.

I allude to the fact that food when eaten must be dissimilar in some respect to the living organism with which it is brought in contact. If it be animal food for instance, and say that in itself it is identical with the tissues of the eater, it must be differentiated by being killed before ingestion, or at all events before the assimilative processes commence. But granting this difference—the difference between the dead and the living—the strain of reciprocal assimilation may take place, the living organism vitalising the dead food, and the dead food deadening the organism, as is indicated in the oppressed feelings of the dyspeptic and the gourmand after food, and the drowsiness of all creatures with full stomachs.

But I trace this process no further here. And indeed I have touched on it so far that I may state how the cosmic law acts when its only field is among objects that have been completely assimilated already. This is important; for it is to be considered that in this



case the objects under it have already completely fulfilled it as to its reciprocal action. In this respect therefore they have nothing more to do. So much of the assimilative energy of each therefore as might have been bestowed upon the other is saved thus intensifying the assimilative action of each upon itself, (1) in confirming its individuality, (2) in preventing the intrusion of others on its rightful sphere of existence or volume, or (3) in liberating it so that it may assert that volume if it be in a state of confinement or concretion.

Hence the aeriform, ultimately the etheriform, is that in which alone an individualized particle of substance possesses all that belongs to it in its relation with space, and the continual operation of the cosmic law as dominant upon it tends to bring it into this state, as will appear hereafter.

### FROM FIRST TO LAST NO CHAOS, NO RUIN.

When indeed we apply the cosmic law only partially, as for instance to universal assimilation in temperature, without regard to its concomitants, speculation obtains very sad results. But the same law, if applied all round, gives the universe at last, not as gathered together into one cold, dark, dead solid monument of its former self, but then, as now, a thing of progressive life and light and beauty, continually burning away indeed, but burning away into the aeriform, that is, into the most perfect form of matter, leaving what we call ashes behind, but ashes out of which arise objects brighter and better than before, yet necessarily perpetuating the same economy, being developed by the same law.

---

# PART II.

## PURE MORPHOLOGY.

By assuming mere points or positions in space, and placing them under the cosmic law, a definite system and economy of forms presents itself, of which the following are the heads.

### SYMMETRY.

This is a name for the similarity of similar parts or particles in their relation to some one position, some one point or line or plane within the form. It may manifest itself in a greater or less degree. But wherever it appears it is explained intellectually by ascribing it to the cosmic law, the law of assimilation.

### SPHERICITY.

As the symmetry of any finite system of points or positions whose tangent planes would enclose a space increases, two eminent stages may be noted, first, that which has one centre for all the points which constitute it, but these are disposed around that centre at different distances from it, except the equiradial series, which are equidistant from it and from each other.

### Cellularity, Vascularity, Hollowness.

But a higher degree of assimilation and symmetry is attained when the positions which constitute the contents of the sphere proceed outwards so as to place themselves along with those which are there already at equal distances from each other, the whole system of points constituting the form being equidistant from each other and from the centre. The form now attained is the spherical cell, and in its development the cosmic law culminates, for plainly no more perfect assimilation of a system of points or positions which are to enclose a space or give a definite volume is possible.

### Deformation, Diffusion, Radiation, Rotation.

But our points must be viewed as individuals as well as an united system, and in this case a much more perfect degree of assimilation than that which is attained in the cell is possible, viz., when they are all equidistant from each other or similarly in juxtaposition to each other,—a homogeneous extension in three dimensions, as in space itself. And in this arrangement they may accordingly be said to be assimilated to space itself.

The spherical cell must therefore be regarded as a transient structure depending on the sustaining power of its own individuality as a united system to resist the tendency of its own constituents and surroundings, which ever aim at its deformation and ultimate diffusion as consisting of so many individualized elements, each bent on asserting its claim as such to the full, that is, its own aeriform volume of space around it as the sphere of existence proper to itself.

### Unification, seemingly Universally Reciprocal Attraction.

Suppose there are given two or any finite number of points at a greater or less distance from each other and perfectly mobile, the cosmic law requires them to be assimilated as to position. They must therefore move towards one another until they meet in one and the same place. They must seem to be guided by an universal attraction among themselves.

And now we have already an anticipation of those seeming oppositions and conflicts which nature so often displays. But it may here be seen that one and the same law may produce them according to its normal mode of action at the time and place. All is not a tending, as some physicists have concluded from seeing the law of assimilation verifying itself in reference to some one mode of motion only, to the utmost concentration and unity. It has for its coordinate in the economy of things the utmost diffusiveness as well. And hence the beauty and the variety of nature, everywhere weaving and unweaving and representing at once unity and omnipresence, the indefeasible attributes of the author of all.

### The Inertia of Motion—Continuity, Persistence.

Any point considered as mobile must, when moving under the cosmic law, move along so that every successive element of its course



shall be assimilated to the first. Now the first element of motion in every case is simply a change in position from the original to the next position adjacent, and this can never be anything else but an element of a straight line lying in a certain direction; and under the law of assimilation every successive element must be assimilated to those which have preceded. The whole motion must therefore be in the same direction, that is, it must be rectilinear. But under the same law similar lengths or equal lines must be described in similar or equal movements or measures of time. The motion therefore as it proceeds along must both be straight in point of direction and equable in point of velocity. It must be uniform. Moreover, if once entered upon, it must go on similarly, that is, for ever.

Thus there immediately results from the cosmic law acting in its simplest case the uniform phenomenon of inertia and the first law of motion.

### The Inertia of Form—Elasticity, Heredity.

This inquiry cannot be carried far by mere insight, even by assuming the simplest forms or by the aid of the most advanced mathematics. If the permanence of the form in hand be provided for so that it is only subject to transient deformations, not to transformation, the law of assimilation provides that after every deformation the original form shall be restored under the condition of the inertia of the points in motion. Hence an everlasting vibration of the points and a phenomenon which would be an ideally perfect elasticity. But deformation and malformation have no place among the permanencies of the cosmical law. The action is ever aiming at the perfect, the infinite, with which however every finite form is at variance, but some more than others. That which is least at variance is the spherical superficies or cell. Hence towards this form whatever is capable of constructing it culminates.

But once constructed as a cell, its continuance in existence as such is all but over. It is forthwith called back to a form less symmetrical if it is to continue to exist, if not, it will be exploded or sublimed by diffusion into the infinite.

### Vibration of Positions—Heat.

From the inertia of form (anticipating elasticity) it follows that a point which has once gone to constitute a form or a closed system of points can never, if left to itself, cease from entertaining a vibratory movement. And a whole system of points so disposed as to constitute under the cosmic law a molecule more or less in accordance with that law, must continue to vibrate round its centre and constitute itself a *punctum saliens*, until it be brought to rest from without.

And if there be two or more such systems face to face with each other, whencesoever they may have come, sooner or later they must be assimilated as to the quantity of vibratory action in each, the vibratory action of each point being less in proportion as the number of points in that system of points is greater.

### The Simultaneous Institution of Opposites—Positive and Negative—Polarity.

A single movement can only be in one and the same direction at the same time. But all the while that it is going on towards new points, it is going off from those which it has reached already. Every single movement therefore has two aspects which are of the same character and yet are the opposites of each other. They therefore pave the way for such terms, constantly occurring in science as positive and negative, and sanctioning such symbols as plus (+) and minus (−).

Suppose two points to be fixed in space at such a distance that whatever the amount of their difference the cosmic law acting directly can do nothing to assimilate them; as, for instance, let one of them be a point of light and the other a point of darkness. Then let one or more mobile points be placed in a line between them, but not close to each other, or let them be restricted to keep as their trajectory the straight line between them, each will be repelled from that fixed point to which it has been assimilated and attracted towards that to which it is still dissimilar, according to the action of the cosmic law, which acts only to isolate objects which have fulfilled it. The mobile point or points therefore fulfilling the cosmic law of assimilation will be carriers of light to the dark points and carriers of darkness to the points of light. And the mobile points may, while thus placed and acting, be said to have each a photic or photiferous pole, and a scotic or scotogenous pole, which through custom and a homage to sensation we should no doubt name respectively the positive and the negative pole.

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# PART III.

## APPLIED MORPHOLOGY—PLASMATOLOGY.

The mathematician having discussed kinematics or the doctrine of the motions of mere or pure points, proceeds to dynamics or that of physical points. In this there is a step in the direction of material nature. It postulates in the points physical force, especially inertia and universal attraction, and consequently regards them as possessing not merely a subjective or mental existence, but an objective, outward, or real existence. In a word, the points regarded are now substantial things, each occupying a definite position in space, and itself dissimilar to space itself.

### Two Essentially Different Kinds of Substance formerly Assumed, viz., Mind and Matter.

It has been a very prevalent conception that this new datum of thought, viz., substance—besides existing in great variety—is of two essentially different kinds, the one mental and the other material.



### They are not Coordinate.

But since in the investigation into knowledge of any other subject whatever or into knowledge itself, we always find ourselves in the last analysis dealing with the phenomena of mind, and as to the phenomena displayed to us by matter, can know them only by mind and in terms of mind, while in neither case we can get beyond phenomena except in the naturally non-reasonable affirmation of substance, it seems wisest not to double that affirmation by setting out with two kinds of substance essentially different, but with one only, and proceed to inquire whether the differences in observed phenomena may not arise from differences in the conditions of existence of that substance.

### Mental Substance the Primordial Unity.

If this be agreed, it is certainly mental and not material substance which has the claim to be this primordial unity. And the question would stand thus—given a mental substance such that it is capable of manifesting all the mental phenomena known to us, sensation, perception, thought, volition, may it not be inferred by a most extensive observation of the economy of things that by attenuation less or more that substance may lose its power of manifesting these higher phenomena, until at last no power remains but that which seems to be of the very essence of mind, viz., activity, implying (1) the power of effecting change within itself, and (2) the power of effecting change in the outward, as for instance that of appearing or manifesting itself to others; the former power (intrinsic activity) being *the last traces of volition*, and the latter being that by which belief in external existence is awoke, *the correlative of perception*.

Accordingly some time ago physicists who did not avail themselves of the elementary dichotomy of existence into creator and creation, substituted for it the dichotomy of matter and force. Of late, however, a finer analysis has found that matter is known only by force and in force, and moreover that such is mind as it exists for us and in us, that nothing but that which is a manifestation of some kind of force can be known to us. There is a growing conviction therefore among materialists as well as others that substance in the last analysis is a thing of life and power, a spirit-nature, a "mind-stuff."

### How this View may be Scientifically Wrought Out.

Let this view be adopted, and let the following data be granted with regard to the substance conceived.

### Cosmic Substance Finite.

1. That its quantity in existence, however vast, is yet finite.

### Divisible—Diffusive.

2. That it may be partitioned or individualized to such an extent that each individual element of substance is next to nothing as a force, being, or thing. Meanwhile, though with loss of individualised force, substance has thus gained diffusion throughout the universe.

### Confluent—Monadgenous.

3. That such or any elements of substance may become confluent into unities (monads) of greater value as powers, recovering mental faculties proportionally to their quantity in the individual, in virtue of the postulate that substance is essentially mental substance or the basis of mental phenomena.

### Two Phases of Existence under Cosmical Law.

And for these phenomena and all phenomena let it be unattenuated or exist in quantity, and (1) let it be wholly and solely obedient to the cosmical law bearing upon it as external to it, that it may be assimilated in its attributes to those of the author of all (the primordial mind), until it acquires such power as an individualized being that it can move freely in the depths of its own activity, and manifest free will, and for the time become an originator of acts and its own universe; and (2) let this volitional phase of isolation be destined to pass off while the light of the cosmic law shines fully in it as well as upon it and directs its choice.

Ultimately, therefore, and when entering normally into the system of the universe, and when on the way of its own well-being, the substance conceived depends for all its phenomena on its intrinsic life and spirit-nature, and the play upon it from without and from within itself of the Theoucosmotectonic, more shortly the cosmic law.

### The Genesis of Physical Force.

The cosmic law is the fountain of physical force. It may be illustrated by the familiar phenomenon of the weight or gravitation of bodies. Plainly, however, this is not a simple phenomenon; we can conceive even a large thing moving spontaneously downwards and hitting our toes without hurting them.

Mental analysis resolves the phenomenon of gravitation into the two following components, viz., universal aggregation and inertia.

### The Unifying Force.

Given two or more morsels of substance so attenuated by partitionment or individuation that they are no longer capable of manifesting mental phenomena, but only their own existence, then it follows under the cosmic law that that law must tend to assimilate them as to their positions in space. They must tend towards the same position as if they were actuated by a mutual attraction.

The phenomenon may be fairly regarded as the residuum of the mental phenomenon of sociality.

### Actual Inertia.

Referring to our pure morphology on this head (p. 7), and instead of a point substituting a morsel of substance similar to that conceived in the last paragraph, the actual phenomenon of inertia plainly emerges, and there is given to nature what is usually called the first law of motion, implying weight or pressure in the direction of motion.



### Divisibility.

Substance though thus ever tending to identity in position and therefore to complete unification is yet divisible, individualizable and diffusible to all but an infinite extent, the cosmic law requiring it to assimilate itself to the whole of space to the full extent that that which is finite can assimilate itself to that which is infinite.

### The Universal Ether.

When partitioned so that each morsel is a minim and next to nothing, though still each an unity and diffused to the utmost degree compatible with the preservation of all the particles in relation with each other so that the whole may still possess a certain degree of unity, the substance conceived as in this state constitutes the ether. It does not either in its particles or as a whole manifest any mental phenomena itself directly, but it shows its relation to these phenomena by its powerful assistance to them as the medium by which embodied minds are enabled to perceive distant objects, as light, the affinity of which to mind has been constantly recognized.

### Matter.

The quantity of ether being finite, its particles under the cosmic law in regions where a synthetic phase of existence prevails must tend to be assimilated as to position. A certain number must group themselves around a common centre. They will not at once rush in upon that centre and become confluent there. Because, having been once individualized for an unknown epoch the cosmic law acting as the law of heredity and tending to assimilate them in their new situations to what they were when diffused to the utmost will prevent their immediate confluence, preserving their previous individuality, admitting them only to remain in juxtaposition and constitute a group of etherial elements which for convenience we have called a nebular speck.

But as the group increases in the number of elements constituting it, the urgency or pressure of all its constituent to be assimilated in position and therefore to press towards the centre must increase. Hence an epoch must arrive when the central pressure is able to overcome the individuality-preserving power of the constituent particles, and those nearest the centre will become confluent. And thus we obtain a new mode of substance, viz., a monadic nucleus invested with its atmosphere of generating ether. And this according to our view is the material element or atom or true unit of atomic weight; for the etherial elements being all under the cosmic law identical with each other except in their positions in space, the central pressure causing confluence and generating nuclei in the nebular specks must effect these nuclei when the speck consists of the same number and quantity of substance in all. In the last analyses of an adequate chemistry, therefore, while the educt is still entitled to the name of matter, all material elements are identical except as to their positions in space.

And here therefore our views depart entirely from those of modern chemistry, which regards the particles of all undecomposable substances which are different from each other as different kinds of matter, not to

be transmuted in each other anywhere in the universe—because forsooth this cannot be done by man at this particular time in this small cold planet which happens to be our embodied dwelling-place for a few minutes in an eternity!

### The Atom.

The senses of touch and of sight take such a lead over those of hearing and smelling in determining our popular views of things that they prompt us always to ask the size and form of objects, meaning the planes of demarcation between these objects as indicated by the senses and the external space—the very conception of which implies a breach in the law of continuity. Now the habit of mind having such an inadequate origin must be quite put away from us if we are to have any rational idea of force. Happily for this view it is held as part of the Newtonian philosophy that every atom in the universe attracts and consequently acts on every other atom, implying an extension of reciprocal action on the part of all atoms to the remotest distances; and indeed without sanctioning this view it is necessary if we are to have any intelligent conceptions of the functioning of atoms at all to consider each atom viewed as an object of sense as a "nucleus" merely invested to an unknown but vast extent by an abiding or continuous effluence or radiation of assimilative thermo-electro-magnetic force.

As to the nucleus of the atom, considering the innumerable number which can be accommodated in what we call a very small space, we are tempted to regard that nucleus as merely a physical point or centre of force. But it is certain that any individualized thing which exists in space, however minute it may be, yes even a physical point as a thing of nature and not merely of mathematical conception must have a definite form and magnitude. And it follows obviously as will be granted on referring to our pure morphology (p. 7) that the form of the nucleus of the atom must be a sphere whose constituent particles are assimilated to each other in position to the utmost; and therefore that the atom is a spherical superficies merely or cell, though inconceivably minute yet real.

And as to its assimilative atmosphere of force, all the successive wavelets, whether peripherad or centrad, which constitute it must be spherical also concentric with the nucleus and with one another.

The consumption of spirit-substance in constituting matter is thus a minimum.

### Molecules.

As the etherial elements in the celestial spaces aggregate into nebular specks whence atoms of matter result, so under the same law, atoms of matter aggregate into molecules. But the atom along with a great recovery of power generally over the ethereal element has a great increase of power in maintaining its own individuality also, its self-assimilative or self-sustaining power. Consequently when atoms aggregate into molecules, no confluence takes place of those in the centre. It may be, however, that in very highly composite material systems new unities of the primal mind-stuff of creation or mental monads are developed.

But in this planet the atoms constituting the molecule exist in juxtaposition only not in confluence. And thus the field is given to nature for physics, chemistry, and petrology.



### Molecular Movements.

The phenomena of molecular and intermolecular action presuppose elements which, from their history of their genesis or the want of material, cannot assume at once a spherical and cellular structure. Hence the cosmic law, in virtue of its proper pulsatory action or specific heat, is always keeping molecules in motion, moving their particles towards the maximum of symmetry, that is, the spherical and the cellular. This, however, only a few light and versatile or polymorphous molecules commonly called organic can actually attain.

### Metamorphism.

Hence secularly or in very long periods of time mere stoney and mechanical deposits tend to become granular and crystalline, especially (1) in regions which formerly have been or still are actuated by more powerful heat, or (2) where the assimilative influence of previously existing crystalline matter acting in their neighbourhood produces the same effect as heat.

### Fermentation.

Very soon also, molecules and molecular unities, which are very active and changeful, especially if manifesting life, when introduced into a volume of matter liquid or solid which as it exists tends towards change, alter it assimilatively—and that always in the interest of molecular perfection, viz., the spherical and cellular or the aeriform state.

To this mode of action chiefly, and the many different ferments provided in the course of the nutritive canal to assimilate the different kinds of food we eat, our living tissues, our life, in spite of a daily and hourly loss which is severe, and if we are active creatures inevitable, is maintained, it may be, for the best part of a century, a longevity which may perhaps be reached hereafter in its integrity, when the laws of hygiene are well understood and fully respected.

### Molecular Force.

Power or force (not quantequivalence) in general in individualized objects is, according to our view (*cæteris paribus*), proportional to the quantity of our protoplasm which constitutes them. The force of molecules ought therefore to be proportional to the number of atoms involved in their structure, and therefore to their atomic weights. And that it is so fully appears from observation, though verification is difficult where so many other features of molecules as well as their atomic weights enter into and determine their functioning. But disregarding those which have dissimilar forms and structures, the following, which, generally speaking, are isomorphous, when properly mated or tested, plainly increase in power as their atomic weights increase, the lightest being named first.

Chlorine, Bromine, Iodine.
Potassium, Rubidium, Cæsium.
Magnesium, Calcium, Strontium, Baryum.
Sulphur, Selenium, Tellurium.
Phosphorus, Vanadium, Arsenic, Antimony, Bismuth.
Boron, Carbon.
Ozone, Fluorine.

### Atomicity.

Elements according to the number of places on their surface, especially their polar and equatorial regions, which are suitable for attaching other elements to them, are said to have different atomicities, a fact which assists greatly in developing the variety of nature, and forms a fertile subject of scientific observation.

Absolute atomic weights = H = 5, C = 30, O = 40, ⓞ = $O_2$ = 80, N = 35, Az = 70.
Conventional H = 1, to many chemists C = 12, O = 16, N and Az = 14.

### Molecular Activity.

This is in the main dependent on form and structure, and the quantity of the generating ether which the nucleus has succeeded in carrying along with it. The further it is from being spherical and cellular, and therefore the more work that is before it in order to the fulfilment of the cosmical law, the more active or disposed for action it is. Yet its inertia is such a hindrance to its activity that that activity may be said (*cæteris paribus*) to be inversely proportional to its atomic weight, and therefore inversely to its force in general.

The type of locomotive activity is hydrogen, of parasitic activity, fluorine; and of very long lived stability, silica and other gems.

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# PART IV.

## NATURE.

But there is no such thing as perfect rest in any molecular structure in nature, no ultimate immutability, nothing permanently dead, no absolute cold. There is molecular action everywhere.

And all molecular action is cyclical, wholly or in part.

The cosmical law fulfilled in any case, then by the analytical and synthetical action, both of which are implied in that law, the structure which has so fulfilled it proves to be resolvable into quasi-embryos fitted to restore it to nature out of its own ashes.

$$\text{Thus, } SiO_2 \left\{ \begin{matrix} Si_2 = 2\ Li = 2\ CH \\ \&c.\quad \&c. \\ O_2 = AzH_2 = C_2H_4 \end{matrix} \right\} = 2\ LiO = 2\ CHO.$$

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